# Lesson 3: Numbers in Exponential Form Raised to a Power

#### Classwork

For any number x and any positive integers m and n,	
$x^{m-n} = x^{mn}$ because	
$x^{m \ n} = x \cdot x \cdots x^{n}$ $m \text{ times}$	
$= x \cdot x \cdots x \times \cdots \times x \cdot x \cdots x$ <i>m</i> times <i>n</i> times <i>n</i> times	
$= x^{mn}$ .	

Exercise 1	Exercise 3
$15^{3} =$	$3.4^{17}$ <sup>4</sup> =

Exercise 2	Exercise 4
$-2^{58} =$	Let <i>s</i> be a number.
	$S^{17} =$

#### **Exercise 5**

Sarah wrote  $3^{5}$   $^{7} = 3^{12}$ . Correct her mistake. Write an exponential expression using a base of 3 and exponents of 5, 7, and 12 that would make her answer correct.

#### **Exercise 6**

A number y satisfies  $y^{24} - 256 = 0$ . What equation does the number  $x = y^4$  satisfy?



Lesson 3: Date: Numbers in Exponential Form Raised to a Power 10/21/14



S.11

Lesson 3

8•1





For any numbers x and y, and positive integer n,

because

 $xy^n = x^n y^n$  $xy^n = xy \cdots xy$ n times  $= x \cdot x \cdots x \cdot y \cdot y \cdots y$ n times n times  $= x^n y^n$ .

Exercise 7	Exercise 10
$11 \times 4^{9} =$	Let <i>x</i> be a number.
	$5x^{7} =$
Exercise 8	Exercise 11

 $3^2 \times 7^{4} =$ 

Exercise 9	Exercise 12
Let $a$ , $b$ , and $c$ be numbers.	Let $a$ , $b$ , and $c$ be numbers.
$3^2 a^{4} 5 =$	$a^{2}bc^{3-4} =$

### Exercise 13

Let x and y be numbers, $y \neq 0$ , and let n be a positive integer. How is $\frac{x}{y}$ related to $x^n$ and $y$	Let x and y be numbers, $y \neq 0$ ,	, and let $n$ be a positive integer	. How is $\frac{x}{y}$	$n$ related to $x^n$ and $y$
---	--------------------------------------	-------------------------------------	------------------------	------------------------------



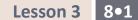
Lesson 3: Date:

Numbers in Exponential Form Raised to a Power 10/21/14



Let *x* and *y* be numbers.

 $5xy^{2} = 7$ 



## **Problem Set**

- 1. Show (prove) in detail why  $2 \cdot 3 \cdot 7^{-4} = 2^4 3^4 7^4$ .
- 2. Show (prove) in detail why  $xyz^4 = x^4y^4z^4$  for any numbers x, y, z.
- 3. Show (prove) in detail why  $xyz^n = x^n y^n z^n$  for any numbers x, y, and z and for any positive integer n.





S.13

